
Instructions to Upload Data Files to California ITHIM

Introduction

California ITHIM accepts csv-formatted input files describing travel patterns of user-defined baselines, business-as-usual, and alternative scenarios. For an entire population, including all persons, whether they travel or not, the travel patterns are expressed as the per capita mean daily miles traveled for the following modes:

- Walk
- Bicycle
- Car-Driver
- Car-Passenger
- Bus
- Rail
- Truck
- Motorcycle

File Preparation

The record layout is comprised of 6 fields (columns), and each block of 17 rows constitutes a travel pattern that is either a baseline, business-as-usual, or other scenario (Tables 1). A template file is downloadable at <https://ww2.arb.ca.gov/ITHIM/TestDataUpload.csv>.

Region

To link your region with the corresponding calibration data, each record must be labeled with the region of interest. The exact, case-sensitive string shown in Tables 1 and 2.

Item_Name

There are two types of travel data that populate the outcome column (Item_Result): 1) per capita mean daily travel distance, or 2) proportion of vehicle miles by mode and facility type. These are default strings that indicate the contents of Item_Result. Do not change these strings in the template.

Scenario_ID

Each block of 17 rows must have a unique Scenario_ID. This may be an alphanumeric string of your own choosing, preferable without blanks or special characters. When these data are uploaded, you will be presented with dialogue boxes with the unique Scenario_IDs. One dialogue box is for selecting the reference travel pattern (baseline or business as-usual) and a second dialogue box is for selecting an alternative. You can provide as many scenarios (in blocks of 17 rows) as you wish, but the ITHIM toll will only analyze two a time. After an analysis, you can return to the Data Upload to select a different pair of Scenario_IDs for analysis.

Mode

The travel modes above do not always correspond to those used in travel demand and activity-based travel models. Users must create a mode crosswalk between their model and California ITHIM. An example of such a cross walk can be found in the *California ITHIM User's Guide and Technical Manual, Appendix B, Table B.5*. If your travel model does not include a specific mode (e.g., motorcycle, bus), leave this field blank. It will be filled using a default value based on alternative data sources such as the California Household Travel Survey, 2012, for your region. When you adapt the template (TestDataUpload2019-07-29.csv), do not change the names of the modes in the template file (Walk, Bike, CarDriver, CarPassenger, Bus, Rail, Motorcycle, Truck).

Strata

You will have to stratify the vehicle miles traveled for cars, trucks, and buses by facility type and calculate the proportion traveled by local roads, arterials, and highways. ITHIM uses three facility types: local roads, arterials, and highways. You will have to create a crosswalk between the facility types in your travel model and ITHIM. Examples of how this is done is in Appendix B. Table B.4 of the *California ITHIM User's Guide and Technical Manual*.

Item_Result

Item_Result is the column where numeric values of travel patterns are reported. As mentioned above, there are two travel outcomes. To avoid rounding error, 10-decimal digit precision is recommended.

1. Per Capita Mean Daily Travel Distance

You must calculate the mean travel distance per person per day for each mode by aggregating data in trip lists and person files. Consult Appendix B. Table B.4 of the *California ITHIM User's Guide and Technical Manual* for more details.

2. Proportion of Vehicle Miles by Mode and Facility Type

For cars, trucks and buses, you must break down the vehicle miles traveled by facility type into three categories: local roads, arterials, and highways. The categories are broader than those typically found in travel demand models, so you must create a facility type crosswalk. An example of such a cross walk can be found in the *California ITHIM User's Guide and Technical Manual, Appendix B, Table B.4*. The results are expressed as a proportion and the proportions must add up to 1 for each mode (e.g., cars: 0.3, 0.2, 0.5; local, arterial, highway respectively).

Please do not change the names of the variables in row one of the template file: Region, Item_Name, Scenario_ID, Mode, Strata, Item_Result. They are case sensitive.

Errors and Warnings

After the data are uploaded, the R/Shiny application checks the user file for format errors and missing data. Fatal errors (no results in the ITHIM Tool) are triggered when:

- Column headings in the user csv file do not match the template (Table 1)
- Item_Name entries do not match the template (Table 1)
- Region entries do not exactly match one of the 6 options or are missing (Table 1)
- Mode entries (Walk, Bike) are duplicated or missing
- Item_Result is missing for bike, walk, car-driver, car-passenger, rail, truck
- There are less than 17 rows for a given baseline, BAU, or scenario

Warnings are generated when there are missing data in Item_Result for motorcycle or bus. Regional baseline averages are used when this occurs, but results are displayed in the ITHIM Tool. Table 3 illustrates the type of error, message, and corresponding flaws in the data file.

Table 1. File layout for ITHIM User Uploaded data (template file: TestDataUpload2019-07-29.csv)

VarName	Definition	CodeLevels
Region	California and 5 MPOS regions	California SF Bay Area San Joaquin Valley Sacramento Area Southern California San Diego County
item_name	Distance Travel by mode or Proportion of Distance by Facility Type	Per Capita Mean Daily Travel Distance Proportion of Vehicle Miles by Mode and Facility Type
ScenarioID	User defined alphanumeric string to identify baseline, business-as-usual (BAU), or scenario	
Mode	Travel mode	Walk Bike CarDriver CarPassenger Bus Rail Motorcycle Truck
strata	Facility Type for Proportion of Vehicle Miles by Mode and Facility Type, for bus, car, truck modes only	local arterial highway
item_result	Percapita mean miles/p/day by mode	10 decimal digit precision

Table 2. Template for Uploading User-Define Scenarios to California ITHIM (TestDataUpload2019-07-29.csv)

Region	Item_Name	Scenario_ID	Mode	Strata	Item_Result
SF Bay Area	Per Capita Mean Daily Travel Distance	Baseline	Bike		0.168491719
SF Bay Area	Per Capita Mean Daily Travel Distance	Baseline	Bus		0.804298858
SF Bay Area	Per Capita Mean Daily Travel Distance	Baseline	CarDriver		15.57070546
SF Bay Area	Per Capita Mean Daily Travel Distance	Baseline	CarPassenger		4.997417115
SF Bay Area	Per Capita Mean Daily Travel Distance	Baseline	Motorcycle		0.131155911
SF Bay Area	Per Capita Mean Daily Travel Distance	Baseline	Rail		0.971146418
SF Bay Area	Per Capita Mean Daily Travel Distance	Baseline	Truck		1.855391233
SF Bay Area	Per Capita Mean Daily Travel Distance	Baseline	Walk		0.412833813
SF Bay Area	Proportion of Vehicle Miles by Mode and Facility Type	Baseline	Bus	arterial	0.754691348
SF Bay Area	Proportion of Vehicle Miles by Mode and Facility Type	Baseline	Bus	highway	0.236154249
SF Bay Area	Proportion of Vehicle Miles by Mode and Facility Type	Baseline	Bus	local	0.009154404
SF Bay Area	Proportion of Vehicle Miles by Mode and Facility Type	Baseline	Car	arterial	0.283216159
SF Bay Area	Proportion of Vehicle Miles by Mode and Facility Type	Baseline	Car	highway	0.630440758
SF Bay Area	Proportion of Vehicle Miles by Mode and Facility Type	Baseline	Car	local	0.086343083
SF Bay Area	Proportion of Vehicle Miles by Mode and Facility Type	Baseline	Truck	arterial	0.240165744
SF Bay Area	Proportion of Vehicle Miles by Mode and Facility Type	Baseline	Truck	highway	0.689439711
SF Bay Area	Proportion of Vehicle Miles by Mode and Facility Type	Baseline	Truck	local	0.070394545
SF Bay Area	Per Capita Mean Daily Travel Distance	Scenario1	Bike		2.11138931
SF Bay Area	Per Capita Mean Daily Travel Distance	Scenario1	Bus		0.804298858
SF Bay Area	Per Capita Mean Daily Travel Distance	Scenario1	CarDriver		14.03316321
SF Bay Area	Per Capita Mean Daily Travel Distance	Scenario1	CarPassenger		4.434174559
SF Bay Area	Per Capita Mean Daily Travel Distance	Scenario1	Motorcycle		0.131155911
SF Bay Area	Per Capita Mean Daily Travel Distance	Scenario1	Rail		0.971146418
SF Bay Area	Per Capita Mean Daily Travel Distance	Scenario1	Truck		1.855391233
SF Bay Area	Per Capita Mean Daily Travel Distance	Scenario1	Walk		0.570721028
SF Bay Area	Proportion of Vehicle Miles by Mode and Facility Type	Scenario1	Bus	arterial	0.754691348
SF Bay Area	Proportion of Vehicle Miles by Mode and Facility Type	Scenario1	Bus	highway	0.236154249

First block of 17 rows to define a baseline, business-as-usual, or scenario

SF Bay Area	Proportion of Vehicle Miles by Mode and Facility Type	Scenario1	Bus	local	0.009154404
SF Bay Area	Proportion of Vehicle Miles by Mode and Facility Type	Scenario1	Car	arterial	0.283216159
SF Bay Area	Proportion of Vehicle Miles by Mode and Facility Type	Scenario1	Car	highway	0.630440758
SF Bay Area	Proportion of Vehicle Miles by Mode and Facility Type	Scenario1	Car	local	0.086343083
SF Bay Area	Proportion of Vehicle Miles by Mode and Facility Type	Scenario1	Truck	arterial	0.240165744
SF Bay Area	Proportion of Vehicle Miles by Mode and Facility Type	Scenario1	Truck	highway	0.689439711
SF Bay Area	Proportion of Vehicle Miles by Mode and Facility Type	Scenario1	Truck	local	0.070394545
SF Bay Area	Per Capita Mean Daily Travel Distance	Scenario2	Bike		0.201023077
SF Bay Area	Per Capita Mean Daily Travel Distance	Scenario2	Bus		1.124816546
SF Bay Area	Per Capita Mean Daily Travel Distance	Scenario2	CarDriver		14.15636404
SF Bay Area	Per Capita Mean Daily Travel Distance	Scenario2	CarPassenger		4.54348431
SF Bay Area	Per Capita Mean Daily Travel Distance	Scenario2	Motorcycle		0.131155911
SF Bay Area	Per Capita Mean Daily Travel Distance	Scenario2	Rail		1.358153811
SF Bay Area	Per Capita Mean Daily Travel Distance	Scenario2	Truck		1.855391233
SF Bay Area	Per Capita Mean Daily Travel Distance	Scenario2	Walk		0.458065123
SF Bay Area	Proportion of Vehicle Miles by Mode and Facility Type	Scenario2	Bus	arterial	0.754691348
SF Bay Area	Proportion of Vehicle Miles by Mode and Facility Type	Scenario2	Bus	highway	0.236154249
SF Bay Area	Proportion of Vehicle Miles by Mode and Facility Type	Scenario2	Bus	local	0.009154404
SF Bay Area	Proportion of Vehicle Miles by Mode and Facility Type	Scenario2	Car	arterial	0.283216159
SF Bay Area	Proportion of Vehicle Miles by Mode and Facility Type	Scenario2	Car	highway	0.630440758
SF Bay Area	Proportion of Vehicle Miles by Mode and Facility Type	Scenario2	Car	local	0.086343083
SF Bay Area	Proportion of Vehicle Miles by Mode and Facility Type	Scenario2	Truck	arterial	0.240165744
SF Bay Area	Proportion of Vehicle Miles by Mode and Facility Type	Scenario2	Truck	highway	0.689439711
SF Bay Area	Proportion of Vehicle Miles by Mode and Facility Type	Scenario2	Truck	local	0.070394545

Third block of 17 rows to define a baseline, business-as-usual, or scenario

Last block of 17 rows to define a baseline, business-as-usual, or scenario

SF Bay Area	Per Capita Mean Daily Travel Distance	Scenario3	Bike		3.601249315
SF Bay Area	Per Capita Mean Daily Travel Distance	Scenario3	Bus		0.804298858
SF Bay Area	Per Capita Mean Daily Travel Distance	Scenario3	CarDriver		12.60299626
SF Bay Area	Per Capita Mean Daily Travel Distance	Scenario3	CarPassenger		4.04503114
SF Bay Area	Per Capita Mean Daily Travel Distance	Scenario3	Motorcycle		0.131155911
SF Bay Area	Per Capita Mean Daily Travel Distance	Scenario3	Rail		0.971146418
SF Bay Area	Per Capita Mean Daily Travel Distance	Scenario3	Truck		1.855391233
SF Bay Area	Per Capita Mean Daily Travel Distance	Scenario3	Walk		0.900312329
SF Bay Area	Proportion of Vehicle Miles by Mode and Facility Type	Scenario3	Bus	arterial	0.754691348
SF Bay Area	Proportion of Vehicle Miles by Mode and Facility Type	Scenario3	Bus	highway	0.236154249
SF Bay Area	Proportion of Vehicle Miles by Mode and Facility Type	Scenario3	Bus	local	0.009154404
SF Bay Area	Proportion of Vehicle Miles by Mode and Facility Type	Scenario3	Car	arterial	0.283216159
SF Bay Area	Proportion of Vehicle Miles by Mode and Facility Type	Scenario3	Car	highway	0.630440758
SF Bay Area	Proportion of Vehicle Miles by Mode and Facility Type	Scenario3	Car	local	0.086343083
SF Bay Area	Proportion of Vehicle Miles by Mode and Facility Type	Scenario3	Truck	arterial	0.240165744
SF Bay Area	Proportion of Vehicle Miles by Mode and Facility Type	Scenario3	Truck	highway	0.689439711
SF Bay Area	Proportion of Vehicle Miles by Mode and Facility Type	Scenario3	Truck	local	0.070394545

Table 3. Examples of Errors and Warning Messages in User Data Uploads

Type of Error/Warning	Example Warning Message	Data File															
Column headings	User Error: Headers are incorrect. Missing Mode.	<table border="1"> <thead> <tr> <th>C</th> <th>D</th> <th>E</th> </tr> </thead> <tbody> <tr> <td>Scenario_ID</td> <td></td> <td>Strata</td> </tr> <tr> <td>Baseline</td> <td>Bike</td> <td></td> </tr> <tr> <td>Baseline</td> <td>Bus</td> <td></td> </tr> <tr> <td>Baseline</td> <td>CarDriver</td> <td></td> </tr> </tbody> </table>	C	D	E	Scenario_ID		Strata	Baseline	Bike		Baseline	Bus		Baseline	CarDriver	
C	D	E															
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Item_Name	User Error: Missing "Per Capita Mean Daily Travel Distance" for Baseline in user uploaded data (csv).	<table border="1"> <thead> <tr> <th>Item_Name</th> </tr> </thead> <tbody> <tr> <td>Per Capita Mean Daily Travel Distances</td> </tr> <tr> <td>Per Capita Mean Daily Travel Distance</td> </tr> <tr> <td>Per Capita Mean Daily Travel Distance</td> </tr> </tbody> </table>	Item_Name	Per Capita Mean Daily Travel Distances	Per Capita Mean Daily Travel Distance	Per Capita Mean Daily Travel Distance											
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Region (misspell/missing)	User Error: The Scenario_ID "Baseline" has either a missing Region value, or contains multiple values in Region.csv).	<table border="1"> <thead> <tr> <th>Region</th> </tr> </thead> <tbody> <tr> <td>San Diego County</td> </tr> <tr> <td>SF Bay Area</td> </tr> <tr> <td>SF Bay Area</td> </tr> </tbody> </table>	Region	San Diego County	SF Bay Area	SF Bay Area											
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Mode duplicated/missing	User Error: The Scenario_ID "Baseline" has an excess or missing "Mode" in Distances in user uploaded data (csv)."	<table border="1"> <thead> <tr> <th>D</th> <th>E</th> <th>F</th> </tr> </thead> <tbody> <tr> <td>Mode</td> <td>Strata</td> <td>Item_Result</td> </tr> <tr> <td></td> <td></td> <td>0.168492</td> </tr> <tr> <td>Bus</td> <td></td> <td>0.804299</td> </tr> <tr> <td>CarDriver</td> <td></td> <td>15.57071</td> </tr> </tbody> </table>	D	E	F	Mode	Strata	Item_Result			0.168492	Bus		0.804299	CarDriver		15.57071
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Item_Result missing (or missing row)	User Error: The Scenario_ID "Baseline" is missing or duplicating mode: Bike.	<table border="1"> <thead> <tr> <th>Mode</th> <th>Strata</th> <th>Item_Result</th> </tr> </thead> <tbody> <tr> <td>Bike</td> <td></td> <td></td> </tr> <tr> <td>Bus</td> <td></td> <td>0.804299</td> </tr> </tbody> </table>	Mode	Strata	Item_Result	Bike			Bus		0.804299						
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Missing motorcycle/bus	Warning: The Scenario_ID "Baseline" is missing values for mode: Bus. Thus, substituting values from ITHIM TOOL's Baseline 2010.	<table border="1"> <thead> <tr> <th>D</th> <th>E</th> <th>F</th> </tr> </thead> <tbody> <tr> <td>Mode</td> <td>Strata</td> <td>Item_Result</td> </tr> <tr> <td>Bike</td> <td></td> <td>0.168492</td> </tr> <tr> <td>Bus</td> <td></td> <td></td> </tr> <tr> <td>CarDriver</td> <td></td> <td>15.57071</td> </tr> </tbody> </table>	D	E	F	Mode	Strata	Item_Result	Bike		0.168492	Bus			CarDriver		15.57071
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